

**APPARATUS AND METHOD FOR TIMEOUT-FREE WAITING FOR AN
ORDERED MESSAGE IN A CLUSTERED COMPUTING ENVIRONMENT**

ABSTRACT OF THE DISCLOSURE

5 A clustered computer system includes multiple computer systems (or nodes) on a
network that can become members of a group to work on a particular task, referred to
herein as a protocol. A protocol is defined so that each phase of the protocol is
terminated with an acknowledge (ACK) round. Within each phase of the protocol, a node
cannot both send and receive a data message. The protocol includes an ACK round that
provides a relative time event that indicates when a data message should be received. If
10 the data message is not received when the ACK round occurs, the receiver knows that the
sender did not send it, and can request that the sender re-send the missing data message.
In a first embodiment, referred to herein as the "post-ACK" case, the receipt of expected
data messages is checked after the ACK round occurs. In a second embodiment, referred
to herein as the "pre-ACK" case, the receipt of expected data messages is checked before
15 the ACK round occurs. In both cases, when the receiver sees the ACK round, it knows
that the sender sent the data message. If the data message was not received by the
receiver, it knows to request that the sender re-send the data message. In this manner the
preferred embodiments provide an architected way for sending and receiving data
messages without using timers in a clustered computing environment that includes
20 ordered messages. As a result, the preferred embodiments may be readily implemented
on computer clusters that include nodes on a wide area network (WAN) that have a large
variability in their response times.